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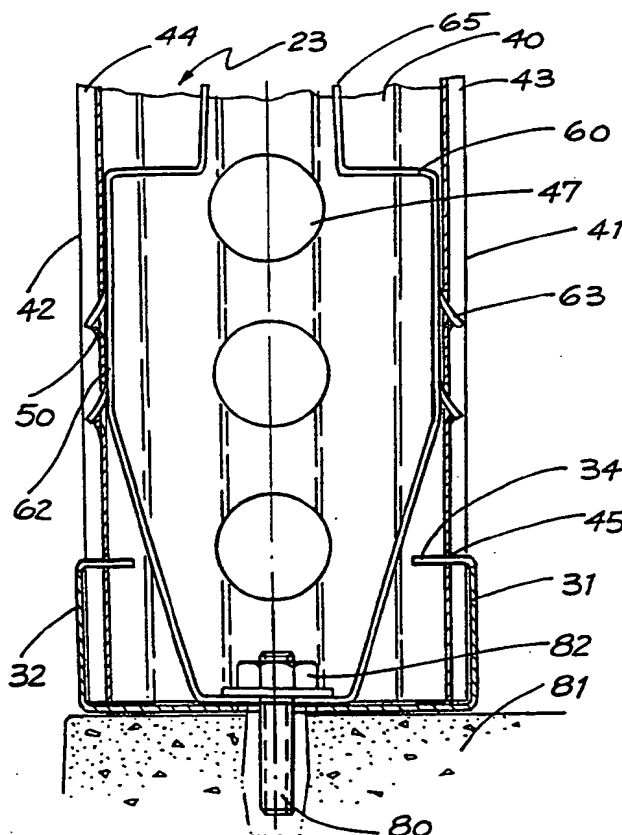
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(54) Title: BUILDING FRAME

(57) Abstract

A clip (60) for securing a metal stud (23) to the top or bottom plate of a wall frame of a building, a nogging strap for interconnecting a plurality of substantially parallel spaced apart metal studs (23) in a wall frame of a building, and a wall frame for a building in which a metal stud (23) is secured to a top or bottom plate by the clip (60) and/or in which metal studs (23) are interconnected by the nogging strap are disclosed. The clip (60) has arm portions (62) which have interlocking projections (63) which interlock with flanges (80) of the stud (23) and the clip (60) is fastened to the top or bottom plate by a fastening element (80, 82). The nogging strap nests within the webs (40) of the studs (23) with the webs (40) projecting into slits in the nogging strap after the nogging strap has been passed serially through aligned apertures in the webs (40) of the studs (23).



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BUILDING FRAMETECHNICAL FIELD

The present invention relates generally to a clip for securing a metal stud to the top or bottom plate of a wall frame of a building, to a nogging strap for interconnecting a plurality of substantially parallel spaced apart metal studs in a wall frame of a building, and to a wall frame for a building in which a metal stud is secured to a top or bottom plate by a clip and/or in which metal studs are interconnected by a nogging strap.

BACKGROUND ART

Various arrangements have been proposed for forming wall frames for buildings in which a horizontally disposed bottom plate and a horizontally disposed top plate are connected by a plurality of vertically extending wall studs.

Australian patent no. 579216 discloses a wall framing structure in which top and bottom plates are formed from U-shaped channels with a plurality of paired inwardly directed tabs arrayed along each of the side walls of the plates. Each stud is formed from C-section and each of the four corners at both ends of the stud is notched. The studs are sized to nest within the plates between two pairs of tabs with the four tabs engaged with the four notches.

Australian patent no. 579216 also discloses a nogging strap for connecting the wall studs of a wall frame. The webs of the studs have apertures which when aligned allow the W-shaped nogging strap to be passed through the studs. The nogging strap is formed with the outer legs of the W folded onto the inner legs of the W and with a number of pairs of slits formed in the outer legs of the W. Adjacent pairs of the slits are separated by a distance the same as the spacing between the webs of adjacent studs. After the nogging strap has been appropriately positioned with the slits aligned with the webs of the studs, the outer legs of the W are splayed away from the inner legs of the W to prevent removal of the nogging strap.

Australian patent application no. 54272/90 discloses

a building clip for strengthening the junction between a wall stud and a wall plate. The illustrated clip consists of an anchor portion which is bolted to the plate and a plurality of hook portions that engage with apertures in the web of the stud. The hook portions project through the web of the stud towards the anchor portion of the clip. As the hooks of the clip engage with only one part of the stud, the clip must be manufactured from reasonably heavy gauge metal.

10 SUMMARY OF THE INVENTION

In a first aspect, the present invention provides a clip for securing a top plate or a bottom plate of a wall frame of a building to a metal stud of the frame which has a web spanning two flanges, characterised in that the clip comprises a body portion arranged to be fastened to the plate and two arm portions arranged to interlock with the flanges of the stud, the arm portions having interlocking projections arranged to interconnect with interlocking recesses in the flanges of the stud, whereby when the body portion is fastened to the plate and the arm portions are interlocked with the flanges of the stud, the clip restrains movement of the plate relative to the stud and the projections do not project substantially beyond the outer faces of the flanges enabling cladding to be mounted on the flanges of the stud.

Preferably, the clip according to the first aspect of the present invention is generally U shaped with the body portion forming the base of the U and connecting the two arm portions which project upwardly from opposite edges of the body portion. Preferably, the interlocking projections are crescent shaped projections which project from the outer faces of the arm portions towards the body portion. Preferably, the body portion is formed with an aperture in approximately the centre of the body portion and the clip is arranged to be fastened to the plate by a nut and bolt with the bolt projecting through the plate and the aperture in the body portion. Preferably, the clip is formed from spring steel, each arm portion is formed with a wing

portion, and the arm portions are arranged to be drawn towards one another under the application of force to the wing portions.

5 In contrast to the building clip illustrated in Australian patent application no. 54272/90, the clip of the present invention does not include a plurality of hook portions which project through apertures in the web of a flange. Rather, the clip according to the present invention is arranged to interlock with both flanges of a
10 stud and can therefore be manufactured from material of lighter gauge than the building clips manufactured according to Australian patent application no. 54272/90. Importantly, the interlocking projections of the clip of the present invention do not project substantially beyond
15 the outer face of the flanges with which the clip is interlocked. This enables cladding to be mounted on the flange despite the fact that the flange is being used for interlocking the stud with the clip. Some cladding materials are reasonably soft, for example, gyprock, which
20 enables them to be mounted on the flange of a stud even though the interlocking projections project a little beyond the outer face of the flange. Preferably however, the interlocking projections do not project beyond the outer face of a flange with which they are interconnected.

25 The clip of the present invention is arranged to interlock with a metal stud having a web spanning two flanges. Typically, the stud will be a length of C-section but alternatively it could be a length of I-section or U-section.

30 In a second aspect, the present invention provides a noggling strap for interconnecting a plurality of substantially parallel spaced apart metal studs in a wall frame of a building, each of the studs having an apertured web spanning two flanges, characterised in that the strap
35 comprises a length of metal section having a series of slits projecting from a first side of the strap towards the centre of the strap at an angle substantially normal to the longitudinal axis of the strap and a second side which is

uninterrupted by slits, the strap being arranged to slide against the second side serially through the apertures in the webs of the studs, whereby when the strap is slid serially through the apertures in the webs and is
5 subsequently rotated about its longitudinal axis, the strap nests in the webs of the studs with the webs projecting into the slits in the first side of the strap to restrain relative movement of adjacent studs in the direction of the longitudinal axis of the strap.

10 Preferably, the slits in the nogging strap according to the second aspect of the present invention taper from their entrances at the first side of the strap to a point whereafter they are parallel sided, substantially normal to the longitudinal axis of the strap, and of a width just
15 greater than the thickness of the webs of the stud in which the strap is arranged to nest. Preferably, the slits project from the first side beyond the centre of the strap.

In contrast to the nogging strap disclosed in Australian patent no. 579216, the nogging strap according
20 to the present invention does not require the splaying of portions of the nogging strap after it has been positioned within the studs. The nogging strap of the present invention is arranged so that it may be slid through the studs on one side and then rotated such that another
25 slotted side is lowermost facilitating nesting of the strap in the webs of the studs. The nogging strap according to the present invention can be installed without the use of any tools. Accordingly, the nogging strap of the present invention is simpler to install than the nogging strap
30 disclosed in Australian patent no. 579216.

Further, unlike the nogging strap disclosed in Australian patent no. 579216, the nogging strap of the present invention can be formed from metal sections of any cross-section. For example, the nogging strap could be
35 formed of C-section, U-section, tube, box, X-section or I-section.

In a third aspect, the present invention provides a wall frame for a building comprising a substantially

horizontal top plate, a substantially horizontal bottom plate and a plurality of substantially vertical spaced apart metal studs extending between the top plate and the bottom plate, each stud having a web spanning two flanges, characterised in that the flanges of at least one of the studs have interlocking recesses which are interlocked with the projections on the arm portions of a clip according to the first aspect of the invention and the body portion of the clip is fastened to either the top plate or the bottom plate by a fastening element.

In a fourth aspect, the present invention provides a wall frame for a building comprising a substantially horizontal top plate, a substantially horizontal bottom plate and a plurality of substantially vertical spaced apart metal studs extending between the top plate and the bottom plate, each stud having an apertured web spanning two flanges with the apertures in the webs being aligned, characterised in that a nogging strap according to the second aspect of the invention nests in the webs of the studs thereby restraining relative movement of the studs in the direction of the longitudinal axis of the strap. Preferably, the apertures in the webs of the studs are oval in shape.

The wall frames according to the present invention preferably incorporate both the clip according to the first aspect of the present invention and the nogging strap according to the second aspect of the present invention. Accordingly, it is preferred that each stud of the wall frame has an apertured web spanning two flanges, the apertures in the webs being aligned and a nogging strap according to the second aspect of the invention nesting in the webs of at least some of the studs thereby restraining relative movement of the studs in the direction of the longitudinal axis of the strap, and the flanges of at least one of the studs having interlocking recesses interconnected with interlocking projections on the arm portions of a clip according to the first aspect of the invention, with the body portion of the clip being fastened

to either the top plate or the bottom by a fastening element.

In some applications, both the top and bottom plates of the wall frame are secured to each of the studs by clips. Typically, the fastening element used for fastening the body portion of each clip to a top or bottom plate will be a bolt. In the case of top plates, the bolt will typically be a tensile bolt which passes through the body portion of the clip and the top plate to be secured by a nut. In addition, the bolt may also pass through an element of a roof structure, such as the foot of a roof truss, to anchor the roof to the wall frame. In the case of a bottom plate, the bolt will typically take the form of a dyna bolt anchored in concrete with the threaded portion of the bolt projecting through the bottom plate and the body portion of the clip to be secured by a nut.

Clips according to the first aspect of the present invention may be the only means by which studs are secured to a plate. This would typically be the case where metal studs are to be secured to wooden plates. In such a case, clips would be used to secure each stud to the top and bottom plates. Preferably however, the top and bottom plates are substantially identical and are formed of generally U-shaped metal section having side walls, a base wall interconnecting the side walls and a plurality of paired inwardly directed tabs arrayed along each of the side walls. The webs of the studs preferably have a width which approximates the spacing between the side walls of the plates with the result that the terminal ends of the studs can be nested within the channels of the plates. Each flange of each stud is preferably formed with a notch located in the centre of the flanges at both ends of the stud with the result that each end of each stud has a pair of notches formed in the pair of flanges. This allows the ends of each stud to be nested within the channels of the plates with the pair of tabs engaging the pair of notches to restrain relative movement of the stud and plate. In this preferred embodiment of the present invention, the

studs and plates are secured together by the tabs and notches and hence clips according to the first aspect of the present invention would be used to strengthen the joint between a stud and a plate rather than to provide the primary means by which they are secured together. In situations where the structure is not exposed to high stresses, clips according to the first aspect of the present invention may be used at selected stud-plate joints rather than at all stud-plate joints. For example, the clips may be used only at stud-plate joints that form part of the corner of a wall. In locations where a wall structure may be exposed to high cyclonic or seismic stresses, a greater proportion of stud-plate joints would be strengthened by the use of clips according to the first aspect of the present invention.

BRIEF DESCRIPTION OF DRAWINGS

Preferred embodiments of the present invention will now be described by way of example only with reference to the accompanying drawings in which:

Figure 1 is a schematic side elevation of a metal framed wall;

Figure 2 is a perspective view of a portion of a top plate or a bottom plate formed from U-section;

Figure 3 is a rear elevation of a stud formed from C-section;

Figure 4 is a rear perspective view of a short length of the base of the stud illustrated in Figure 3;

Figure 5 is a front perspective view of the base of the stud illustrated in Figure 4;

Figure 6 is a plan view of the stud illustrated in Figure 3 nested within the plate illustrated in Figure 2,

Figure 7 is a cross-section through line A-A of Figure 5;

Figure 8 is a perspective view of a building clip;

Figure 9 is a front elevation of the building clip illustrated in Figure 8;

Figure 10 is a front elevation of a short length of the base of the stud illustrated in Figure 3 nested within the

plate illustrated in Figure 2 and secured to the plate illustrated in Figure 2 by the building clip illustrated in Figure 8;

Figure 11 is a schematic perspective view of a metal framed wall;

Figure 12 is a perspective view of a nogging strap; and

Figure 13 is a detailed perspective view of the encircled area marked B in Figure 11.

BEST MODE OF PERFORMING INVENTION

Referring firstly to Figure 1, the metal framed wall 20 comprises a substantially horizontal top plate 21, a substantially horizontal bottom plate 22 and a plurality of substantially vertical spaced apart metal studs 23 extending between the top and bottom plates 21 and 22. The wall frame 20 has a window opening 24. Shorter studs 25 and 26 extend from a bottom plate 27 at the top of the window opening 24 to the top plate 21 and from a top plate 28 at the bottom of the window opening 24 to the lower plate 22 respectively. A nogging strap 29 interconnects the studs 23.

Referring now to Figure 2, each of the top plates 21 and 28 and the bottom plates 22 and 27 are formed from U-section 30. The U-section 30 has a pair of side walls 31 and 32 interconnected by a base wall 33. A series of tabs 34 extend into the U-section 30 from each side wall 31 and 32. The tabs 34 are arranged as pairs 34A, 34B, 34C etc. for engagement with studs 23, 25 and 26. A series of square apertures 35 are formed in the centre of the base wall 33 and allow for the projection of bolts (not shown) through the base wall 33. Additionally, the apertures 35 may be used when joining two pieces of U-section 30 together with a splicer (not shown). The splicer (not shown) can be used to join two pieces of U-section 30 together either end-to-end or side-to-end.

Referring now to Figures 3, 4 and 5, each of the studs 23, 25 and 26 are formed from C-section and further reference is only made to stud 23. The stud 23 consists of a web 40 spanning two primary flanges 41 and 42.

Secondary flanges 43 and 44 project inwardly from the ends of flanges 41 and 42 respectively to complete the C. The web 40 has a width approximating the distance between side walls 31 and 32 of the U-section 30. Each flange 41 and 42 is formed with a horizontal notch 45 positioned in the centre of the flange at a distance from the end 46 of the stud 23 which is approximately equal to the height of the side walls 31 and 32 of the U-section 30. Three circular apertures 47 are formed in the web 40 adjacent each end of the stud 23 and a pair of circular apertures 48 are formed in the web 40 adjacent the centre of the stud 23. The apertures 47 and 48 enable wiring (not shown) and piping (not shown) to be run within the wall 20 and neoprene grommets (not shown) may be located in the apertures 47 and 48 to prevent water hammer in pipes and the cutting of insulation of wiring.

Referring now to Figure 6, the stud 23 is nested within the U-section 30 with the pair of tabs 34D engaging the notches 45 to restrain relative movement of the stud 23 and the U-section 30. In nesting the stud 23 within the U-section 30, the stud 23 is placed between the side walls 31 and 32 with the web 40 approximately parallel to the side walls 31 and 32 and the end 46 resting on the base wall 33. The stud 23 is then rotated through approximately 90° until the pair of tabs 34 engage the slots 45. To assist in engaging the pair of tabs 34 in the slots 45, the flanges 41 and 42 can be squeezed towards one another whilst the tabs 34 and slots 45 are aligned. The flanges 41 and 42 are then allowed to spring back to their resting positions. Each end of each stud 23 is engaged with its respective top or bottom plate 21 or 22 in this manner and thus each stud 23 is held captive between its top and bottom plates 21 and 22 at four points; two at each end.

Referring again to Figures 4 and 5, and additionally to Figures 7, 8 and 9, both flanges 41 and 42 are formed with two recesses 50 at each end of each stud 23 which enables each stud 23 to be secured to its top or bottom plate 21 or 22 with a building clip 60. The building clip

60 is formed from spring steel and has a body portion 61 joining two arm portions 62. Each arm portion 62 has two crescent shaped projections 63 projecting outwardly of the clip towards the body portion 61. The body portion 61 is formed with a circular aperture 64 to enable the clip 60 to be fastened to a top or bottom plate 21 or 22 by a bolt (not shown). The projections 63 are arranged to interconnect with the recesses 50 in the stud 23. The clip 60 is sized relative to the stud 23 such that the spacing between the arms 62 of the clip 60 is a little less than the distance between the flanges 41 and 42 of the stud 23, thereby allowing the projections 63 to slide snugly into the recesses 50 with the body portion 61 approximately level with the end 46 of the stud 23. To assist in locating the clip 60 within the stud 23, the clip 60 is provided with two wings 65 which are sized and positioned to allow them to be grasped between a thumb and a forefinger. Squeezing the wings 65 together lessens the spacing between the arms 62 making alignment of the projections 63 and the recesses 50 easier. Once the projections 63 and recesses 50 are aligned, release of the wings 65 facilitates interlocking of the projections 63 and the recesses 50.

Referring now to Figure 10, the stud 23 is nested within the U-section 30 with the pair of tabs 34 engaging the notches 45 and with the building clip 60 securing the stud 23 to the bottom plate 22. A dyna bolt 80 is set in a concrete base 81. The bolt 80 projects upwardly through one of the apertures 35 in the base wall 33 of the bottom plate 22 and through aperture 64 in the body portion 61. The bolt 80 is secured by a nut 82 sitting atop a washer. The present invention requires that the projections do not project substantially beyond the outer faces of the flanges thereby enabling cladding to be mounted on the flanges of the stud and it is to be noted that the illustrated projections 63 do not project at all beyond the outer faces of flanges 41 and 42. However it is to be understood that the present invention includes embodiments in which the

projections do project beyond the outer faces of the flanges provided that the projections do not prevent the mounting of cladding. For example, the present invention includes an embodiment in which the projections project a
5 little beyond the outer faces of the flanges and can be hammered against the faces of the flanges prior to the mounting of cladding. The present invention also includes an embodiment in which a soft cladding, such as gyprock, is used and in which the projections project somewhat into the
10 soft cladding. It is also to be noted that the illustrated clip 60 does not obstruct wiring or piping from being laid through apertures 47.

Referring again to Figure 3, and additionally to Figures 11, 12 and 13, each stud 23 is formed with an oval
15 aperture 90 centrally of the web 40. The apertures 90 are used in conjunction with the nogging strap 29 for interconnecting the studs 23. The nogging strap 29 is a length of U-section and a first side 92 of the strap 91 is interrupted by a series of slits 93. The slits 93 are
20 formed in pairs in flanges 94 and 95 of the strap 91. A second side 96 of the strap 91 is uninterrupted by slits. As best illustrated in Figure 13, the strap 91 can be slid through the apertures 90 against the second side 96, with the first side 92 other than lowermost, until the slits 93
25 are aligned with the webs 40 of the studs 23. Upon rotation to the point where the first side 92 is lowermost, the strap 91 nests in the webs 40 with the webs 40 projecting into the slits 93. To assist in nesting the strap 91 in the webs 40, the slits 93 taper from their
30 entrances 97 to a point 98 whereafter they are parallel sided.

CLAIMS

1. A clip for securing a top plate or a bottom plate of a wall frame of a building to a metal stud of the frame which has a web spanning two flanges, characterised in that
5 the clip comprises a body portion arranged to be fastened to the plate and two arm portions arranged to interlock with the flanges of the stud, the arm portions having interlocking projections arranged to interconnect with interlocking recesses in the flanges of the stud, whereby
10 when the body portion is fastened to the plate and the arm portions are interlocked with the flanges of the stud, the clip restrains movement of the plate relative to the stud and the projections do not project substantially beyond the outer faces of the flanges enabling cladding to be mounted
15 on the flanges of the stud.

2. A clip as claimed in claim 1 characterised in that the clip is generally U shaped with the body portion forming the base of the U and connecting the two arm portions which portions project upwardly from opposite
20 edges of the body portion.

3. A clip as claimed in claim 1 or claim 2 characterised in that the interlocking projections are crescent shaped projections which project from the outer faces of the arm portions towards the body portion.

25 4. A clip as claimed in any one of the claims characterised in that the body portion is formed with an aperture in approximately the centre of the body portion and the clip is arranged to be fastened to the plate by a nut and bolt with the bolt projecting through the plate and
30 the aperture in the body portion.

5. A clip as claimed in any one of the preceding claims characterised in that the clip is formed from spring steel, each arm portion is formed with a wing portion, and the arm portions are arranged to be drawn towards one
35 another under the application of force to the wing portions.

6. A nogging strap for interconnecting a plurality of substantially parallel spaced apart metal studs in a wall

frame of a building, each of the studs having an apertured web spanning two flanges, characterised in that the strap comprises a length of metal section having a series of slits projecting from a first side of the strap towards the centre of the strap at an angle substantially normal to the longitudinal axis of the strap and a second side which is uninterrupted by slits, the strap being arranged to slide against the second side serially through the apertures in the webs of the studs, whereby when the strap is slid serially through the apertures and is subsequently rotated about its longitudinal axis, the strap nests in the webs of the studs with the webs projecting into the slits in the first side of the strap to restrain relative movement of adjacent studs in the direction of the longitudinal axis of the strap.

7. A nogging strap as claimed in claim 6 characterised in that the slits taper from their entrances at the first side of the strap to a point whereafter they are parallel sided, substantially normal to the longitudinal axis of the strap, and of a width just greater than the thickness of the webs of the studs in which the strap is arranged to nest.

8. A nogging strap as claimed in claim 6 or claim 7 characterised in that the strap is formed from C-section, U-section, tube, box, X-section or I-section.

9. A nogging strap as claimed in any one of claims 6-8 characterised in that the slits project from the first side beyond the centre of the strap.

10. A wall frame for a building comprising a substantially horizontal top plate, a substantially horizontal bottom plate and a plurality of substantially vertical spaced apart metal studs extending between the top plate and the bottom plate, each stud having an apertured web spanning two flanges with the apertures in the webs being aligned, characterised in that a nogging strap as claimed in any one of claims 6-9 nests in the webs of the studs thereby restraining relative movement of the studs in the direction of the longitudinal axis of the strap.

11. A wall frame as claimed in claim 10 characterised in that the apertures in the webs are oval in shape.

12. A wall frame for a building comprising a substantially horizontal top plate, a substantially horizontal bottom plate and a plurality of substantially vertical spaced apart metal studs extending between the top plate and the bottom plate, each stud having a web spanning two flanges, characterised in that the flanges of at least one of the studs have interlocking recesses which are interlocked with the projections on the arm portions of a clip as claimed in any one of claims 1-5, and the body portion of the clip is fastened to either the top plate or the bottom plate by a fastening element.

13. A wall frame for a building comprising a substantially horizontal top plate, a substantially horizontal bottom plate and a plurality of substantially vertical spaced apart metal studs extending between the top and bottom plates, each stud having an apertured web spanning two flanges with the apertures in the webs being aligned, characterised in that firstly, a nogging strap as claimed in any one of claims 6-9 nests in the webs of the studs thereby restraining relative movement of the studs in the direction of the longitudinal axis of the strap, and secondly in that the flanges of at least one of the studs have interlocking recesses which are interlocked with the projections on the arm portions of a clip as claimed in any one of claims 1-5 and the body portion of the clip is fastened to either the top plate or the bottom plate by a fastening element.

14. A wall frame as claimed in claim 12 or claim 13 characterised in that the clip is fastened to the top plate by a nut and bolt with the bolt projecting through the body portion of the clip and the top plate.

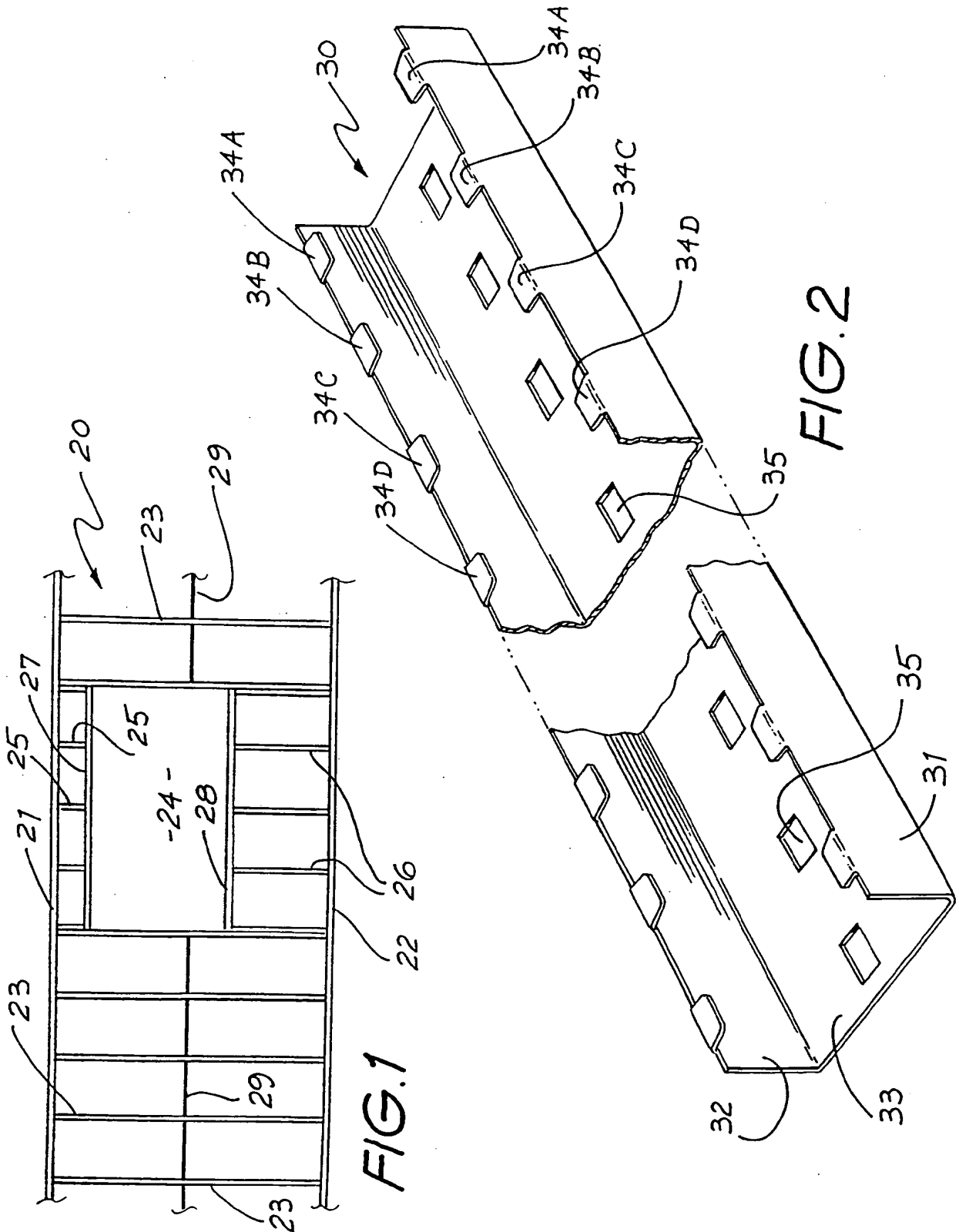
15. A wall frame as claimed in claim 14 characterised in that the bolt additionally pass through an element of roof structure to secure the roof structure to the top of the wall frame.

16. A wall frame as claimed in claim 12 or claim 13

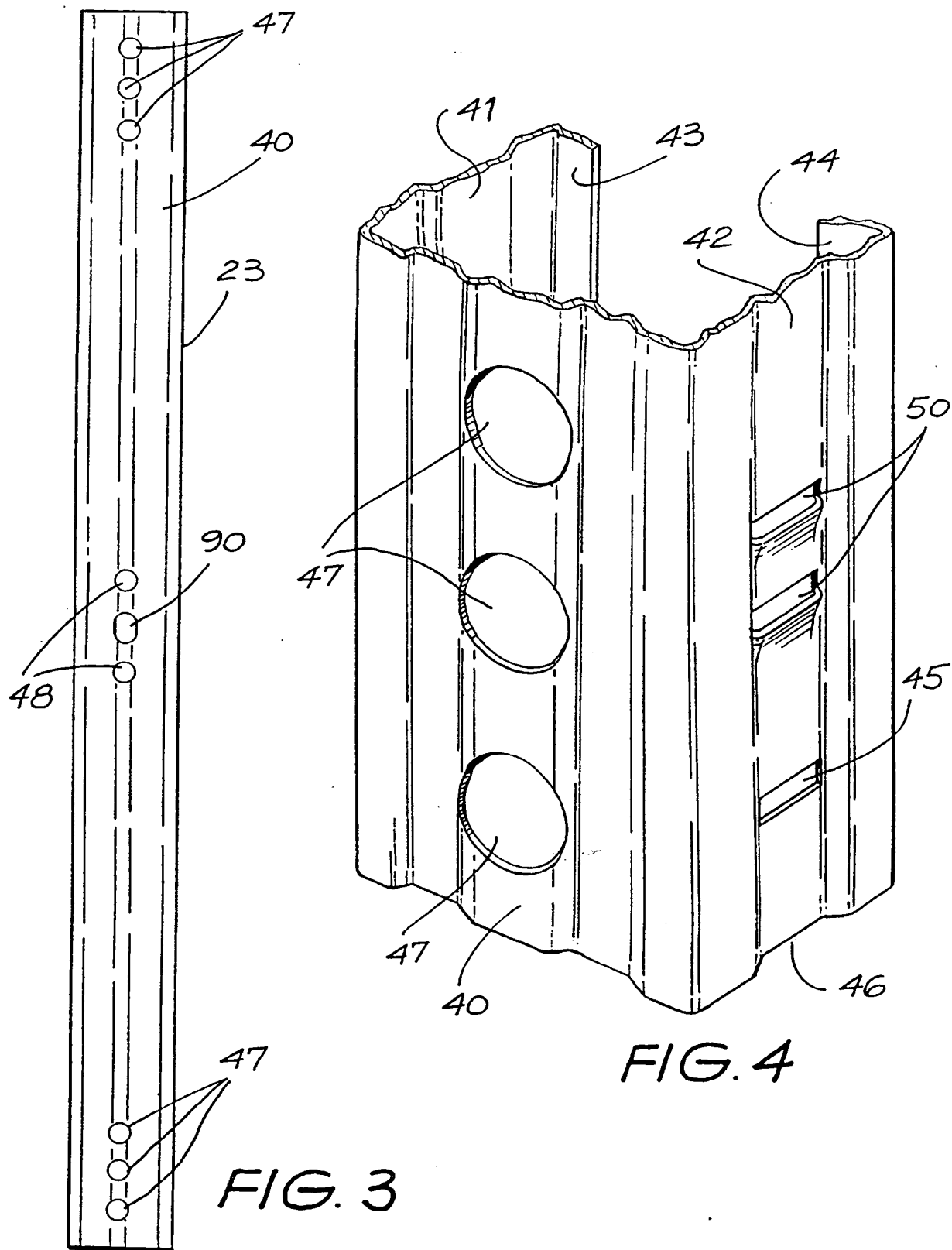
characterised in that the bottom plate rests upon a concrete pad, the bottom plate is fastened to the clip by a nut and bolt with the head of the bolt secured in the concrete pad and the bolt projecting through the bottom plate and the body portion of the clip.

17. A wall frame as claimed in any one of claims 10-16 characterised in that the top plate and the bottom plate are substantially identical and are formed of generally U-shaped metal section having side walls, a base wall interconnecting the side walls and a plurality of paired inwardly directed tabs arrayed along each of the side walls, the webs of the studs having a width approximately equal to the spacing between the side walls of the plates whereby the terminal ends of the studs may be nested within the channels defined by the plates, each flange of each stud being formed with a notch located substantially centrally of the flange adjacent both terminal ends of the stud to form a pair of notches adjacent the terminal ends of each stud, and the terminal ends of each stud being nested within the channels of the top plate and the bottom plate with a pair of the tabs engaging a pair of the notches at both terminal ends of each stud to restrain movement of the studs relative to the plates.

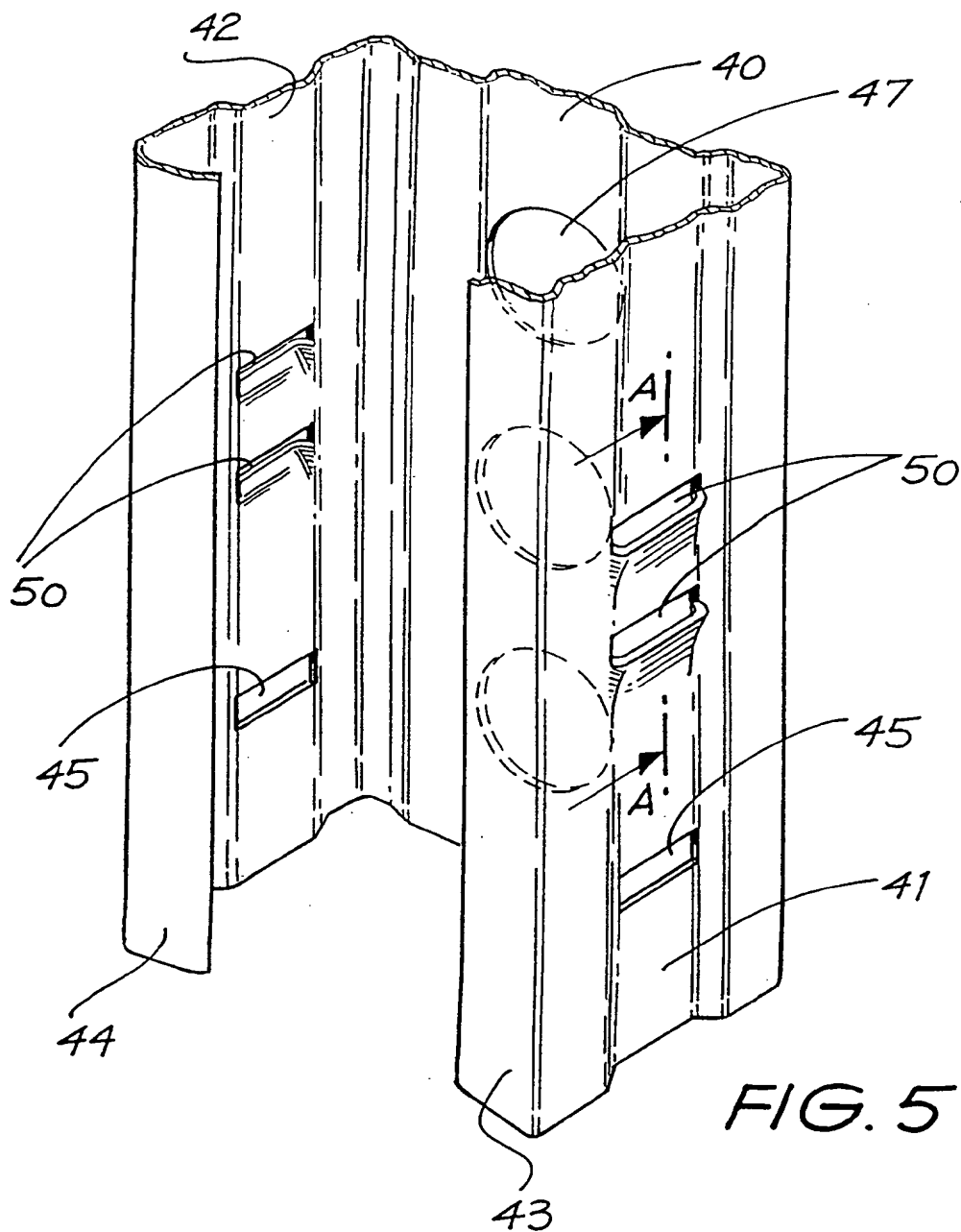
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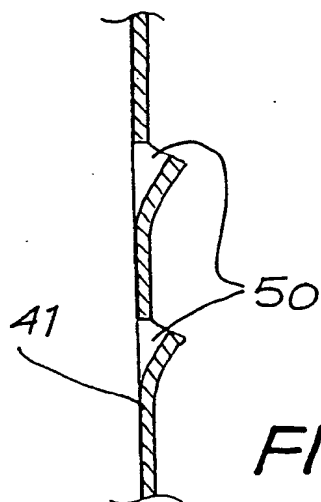
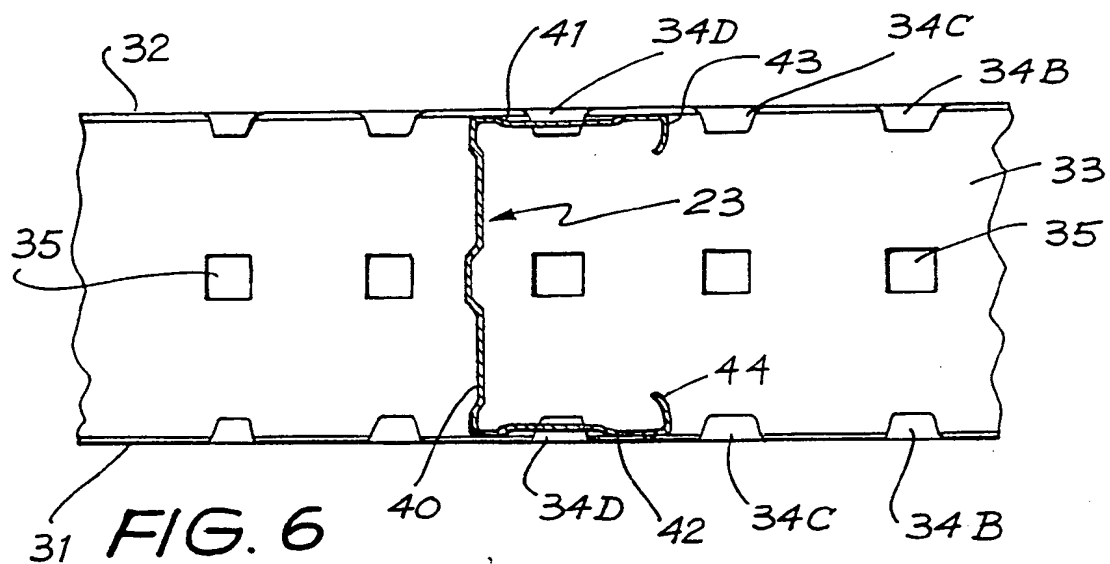
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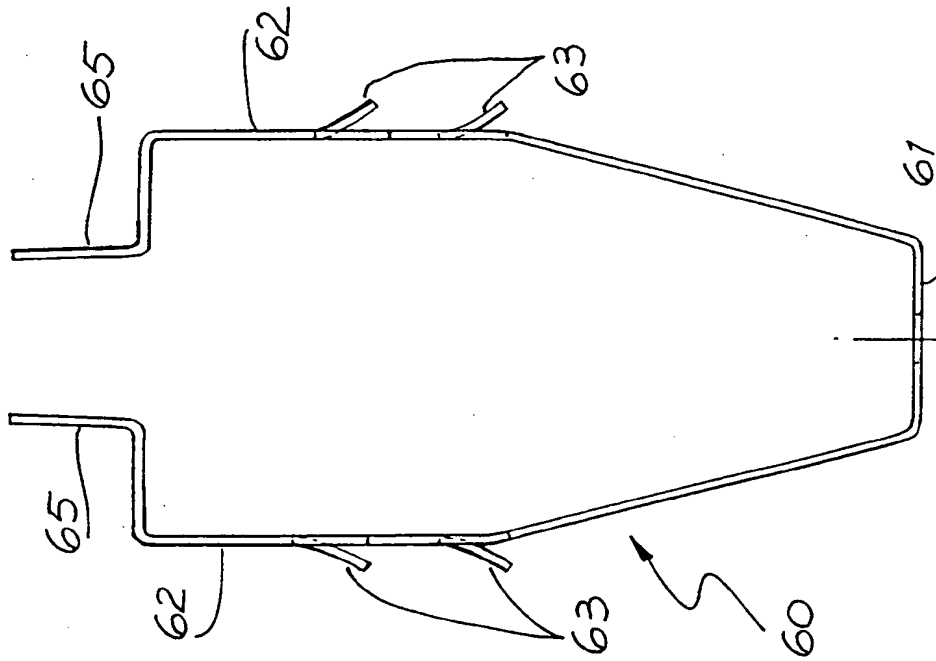


FIG. 9

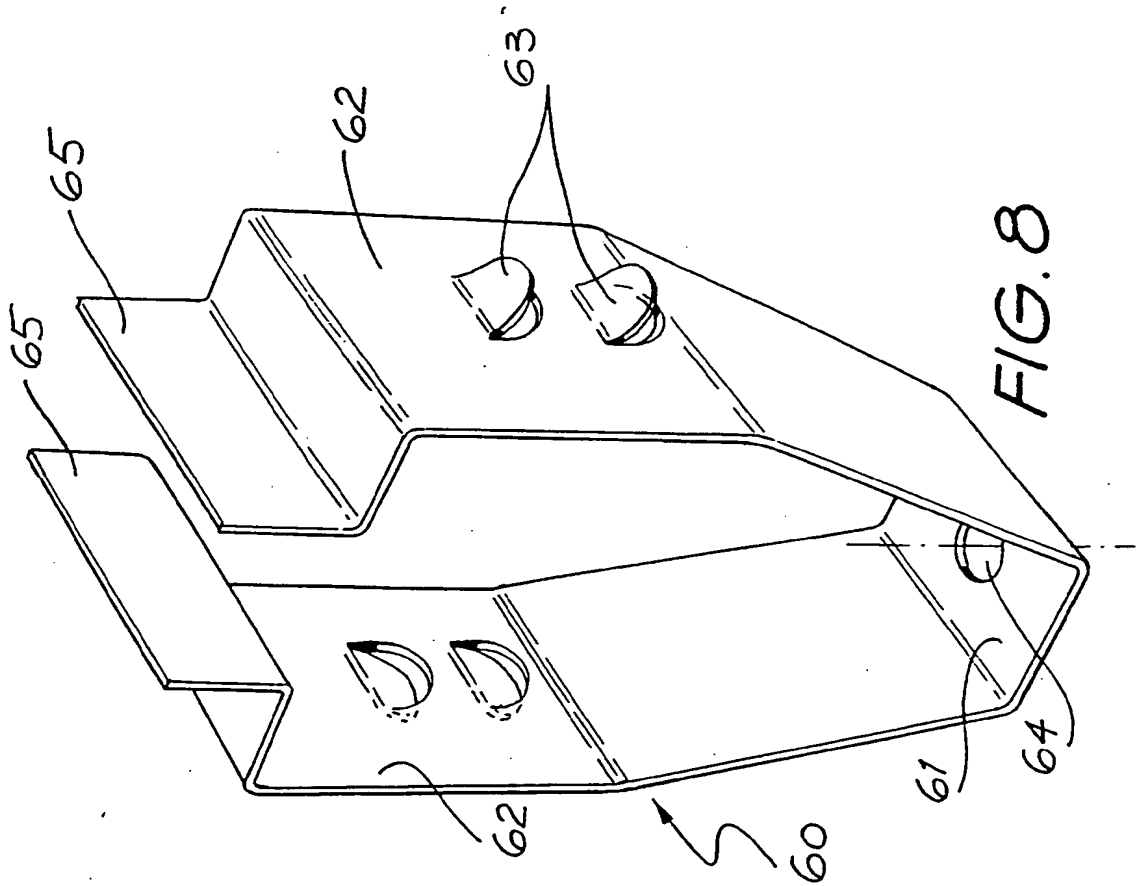
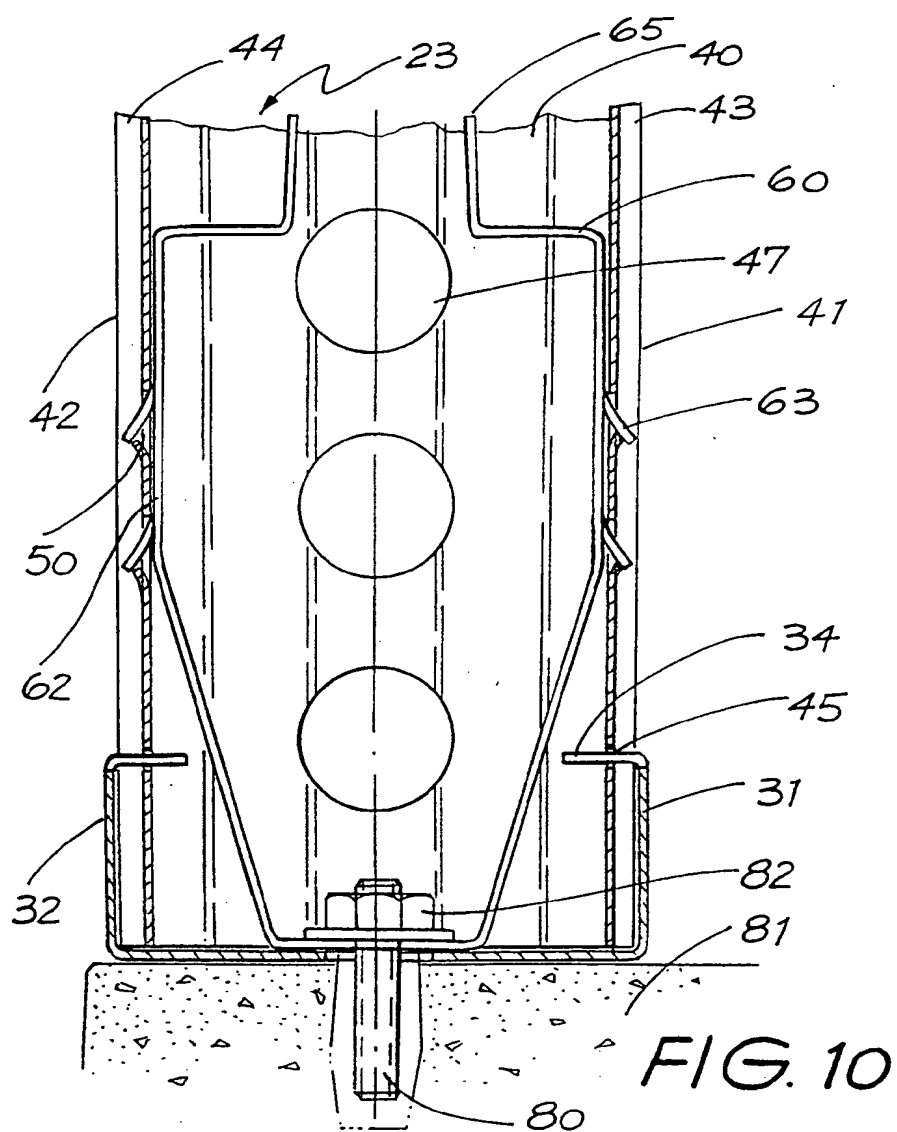
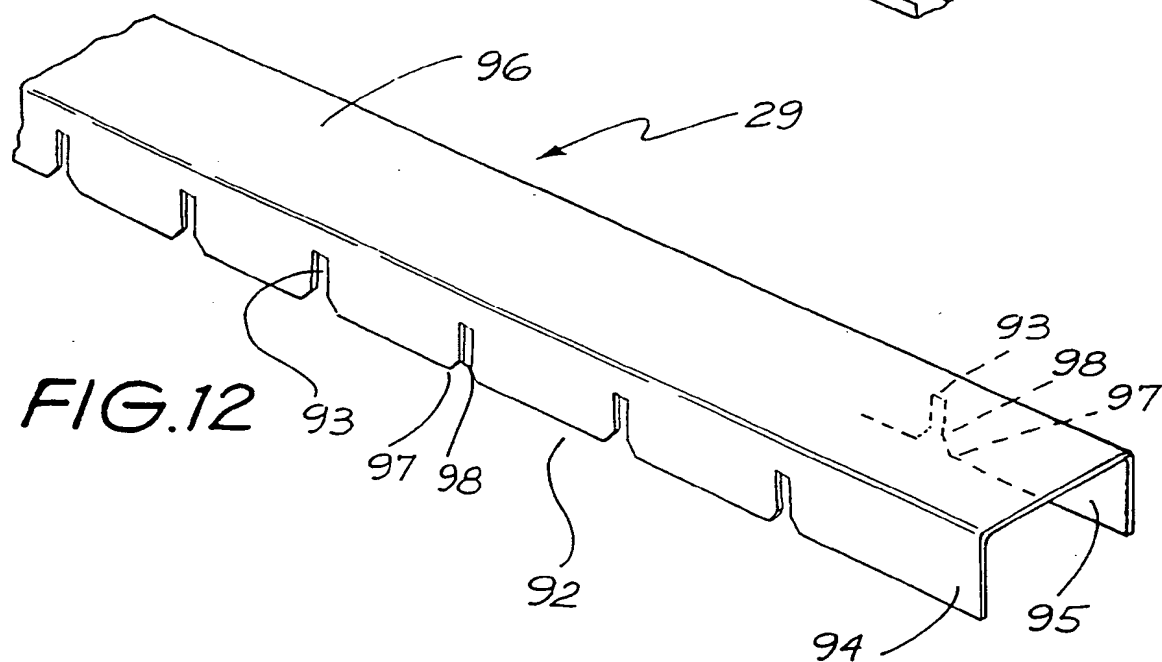
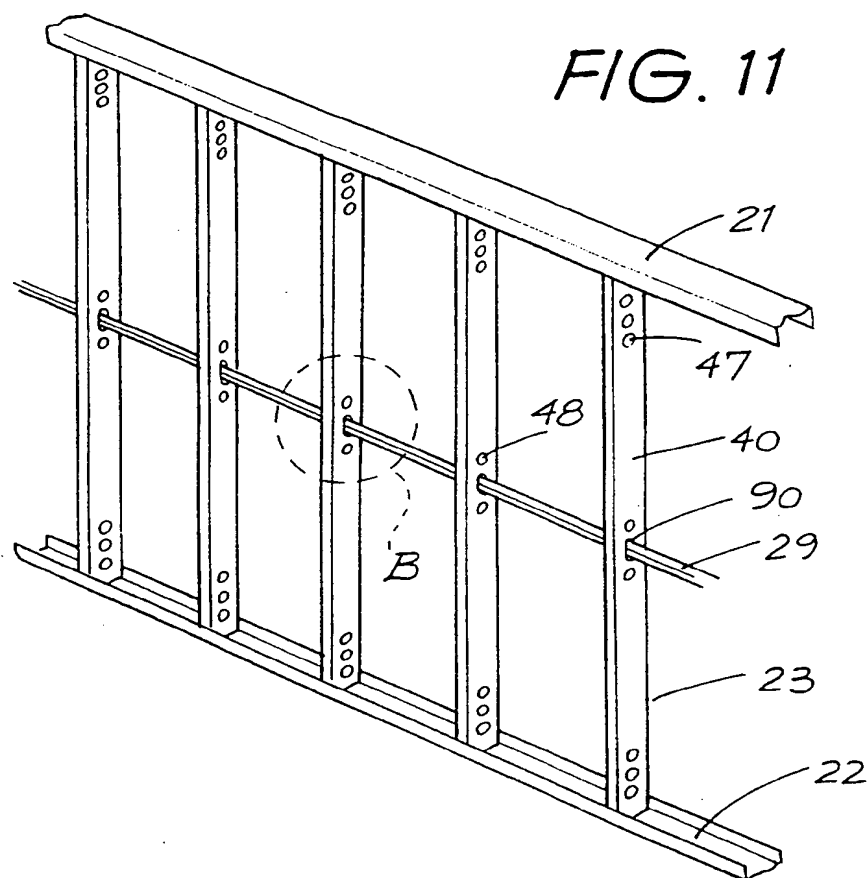


FIG. 8

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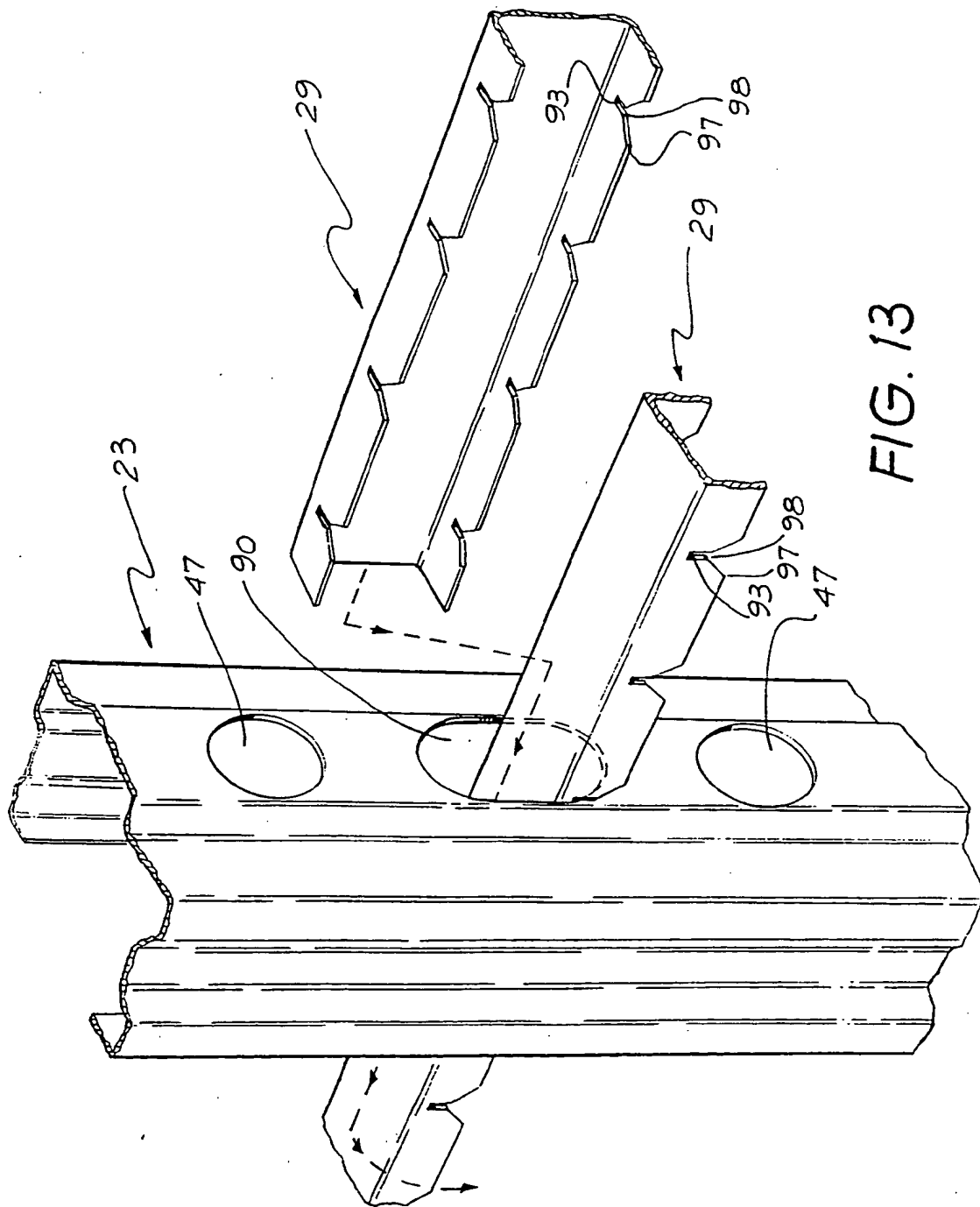


FIG. 13

A. CLASSIFICATION OF SUBJECT MATTER Int. Cl. ⁵ E04B 2/60; E04C 3/32 According to International Patent Classification (IPC) or to both national classification and IPC				
B. FIELDS SEARCHED Minimum documentation searched (classification system followed by classification symbols) IPC: E04B 1/38, 1/58, 2/58, 2/60; E04C 3/32 Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched AU: IPC as above and E04B 2/00; F16B 7/04 Electronic data base consulted during the international search (name of data base, and where practicable, search terms used) DERWENT JAPIO				
C. DOCUMENTS CONSIDERED TO BE RELEVANT				
Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to Claim No.		
X Y	GB,A,1566914 (AIMAR) 8 May 1980 (08.05.80) page 1 lines 27-43, figures 1-3	1-5,12,14 17		
X Y	Patents Abstracts of Japan, M1405, page 54 JP,A,4-357229 (ASHAI CHEM IND CO LTD) 10 December 1992 (10.12.92)	1-4,12,14 17		
Y	GB,A,2119889 (AM AND S EUROPE LIMITED (UK)) 22 November 1983 (22.11.83) page 1 lines 26-50, figures 1A, 1B	17		
<div style="display: flex; justify-content: space-between;"> <div> <input checked="" type="checkbox"/> Further documents are listed in the continuation of Box C. </div> <div> <input checked="" type="checkbox"/> See patent family annex. </div> </div>				
<table style="width: 100%; border: none;"> <tr> <td style="width: 50%; vertical-align: top;"> <p>* Special categories of cited documents :</p> <p>"A" document defining the general state of the art which is not considered to be of particular relevance</p> <p>"E" earlier document but published on or after the international filing date</p> <p>"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)</p> <p>"O" document referring to an oral disclosure, use, exhibition or other means</p> <p>"P" document published prior to the international filing date but later than the priority date claimed</p> </td> <td style="width: 50%; vertical-align: top;"> <p>"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention</p> <p>"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone</p> <p>"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art</p> <p>"&" document member of the same patent family</p> </td> </tr> </table>			<p>* Special categories of cited documents :</p> <p>"A" document defining the general state of the art which is not considered to be of particular relevance</p> <p>"E" earlier document but published on or after the international filing date</p> <p>"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)</p> <p>"O" document referring to an oral disclosure, use, exhibition or other means</p> <p>"P" document published prior to the international filing date but later than the priority date claimed</p>	<p>"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention</p> <p>"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone</p> <p>"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art</p> <p>"&" document member of the same patent family</p>
<p>* Special categories of cited documents :</p> <p>"A" document defining the general state of the art which is not considered to be of particular relevance</p> <p>"E" earlier document but published on or after the international filing date</p> <p>"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)</p> <p>"O" document referring to an oral disclosure, use, exhibition or other means</p> <p>"P" document published prior to the international filing date but later than the priority date claimed</p>	<p>"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention</p> <p>"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone</p> <p>"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art</p> <p>"&" document member of the same patent family</p>			
Date of the actual completion of the international search 1 September 1993 (01.09.93)		Date of mailing of the international search report 13 SEP 1993 (13.09.93)		
Name and mailing address of the ISA/AU AUSTRALIAN INDUSTRIAL PROPERTY ORGANISATION PO BOX 200 WODEN ACT 2606 AUSTRALIA Facsimile No. (06) 2853929		Authorized officer D.R. LUM Telephone No. (06) 2832544		

C(C ntinuation). DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate of the relevant passages	Relevant to Claim No.
A	US,A,4858407 (SMOLIK) 22 August 1989 (22.08.89) figures 1-4	6-11,13-17
A	AU,A,16247/92 (EL BARADOR HOLDINGS PTY LTD) 11 February 1993 (11.02.93) figures 1 and 2	1-5,12-17
A	AU,A,75520/81 (MIEYAL) 1 April 1982 (01.04.82) figures 3 and 4	1-5,12-17
A	US,A,2936049 (HOVIND) 10 May 1960 (10.05.60) column 1 lines 28-50	1-5,12-17

Box I Observations where certain claims were found unsearchable (Continuation of Item 1 of first sheet)

This international search report has not established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. ☐ Claims Nos.:
because they relate to subject matter not required to be searched by this Authority, namely:
2. ☐ Claim Nos.:
because they relate to parts of the international application that do not comply with the prescribed requirements to such an extent that no meaningful international search can be carried out, specifically:
3. ☐ Claims Nos.:
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

Box II Observations where unity of invention is lacking (Continuation of item 2 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:

The claim set comprises two independent claims, at claim 1 and claim 6, and is directed to 2 inventions:

Claims 1-5 a clip
Claims 6-9 a hogging strap

which clearly do not share a single general inventive concept.

As there is no subject matter in common to all the claims, the independent claims lack unity a priori (Rules 13.2 and 13.3).

1. ☒ As all required additional search fees were timely paid by the applicant, this international search report covers all searchable claims
2. ☐ As all searchable claims could be searched without effort justifying an additional fee, this Authority did not invite payment of any additional fee.
3. ☐ As only some of the required additional search fees were timely paid by the applicant, this international search report covers only those claims for which fees were paid, specifically claims Nos.:
4. ☐ No required additional search fees were timely paid by the applicant. Consequently, this international search report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:

Remark on Protest

- ☐ The additional search fees were accompanied by the applicant's protest.
- ☐ No protest accompanied the payment of additional search fees.

Patent Document Cited in Search Report				Patent Family Member			
GB	1566914	DE IT	2709197 1056908	ES	226117	FR	2343153
AU	75520/81	CA GB ZA	1176425 2084629 8106328	DE NZ	3137426 198360	FR US	2490698 4397127

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